NFV Director Environment Sizing Guide

June 2015

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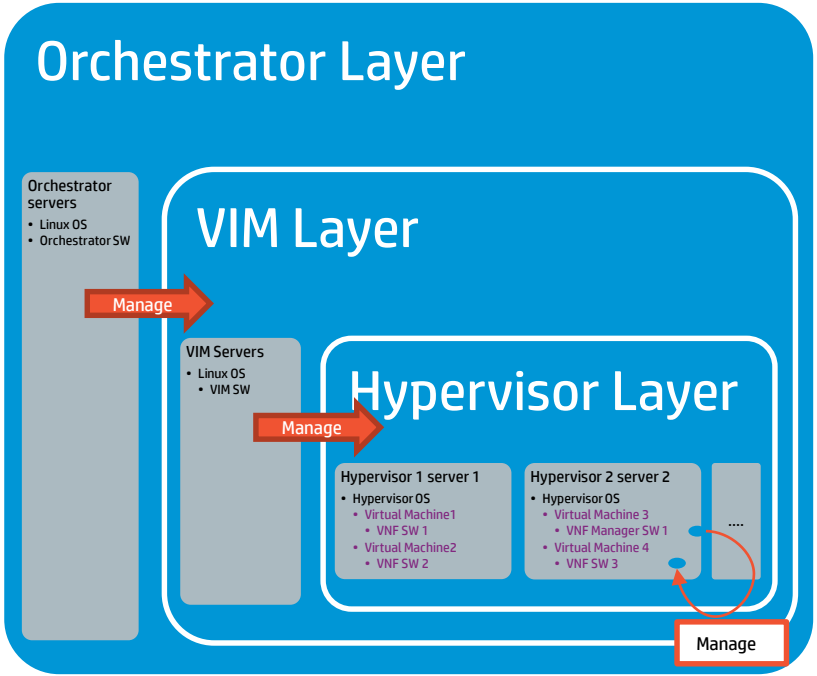
Objectives

Physical server or dedicated hypervisor | Virtual Machine inside an hypervisor

What this document address

- Provide some understanding of what you need to set up an environment to demonstrate VNF
- Provide some options (not exhaustive) of how to set up the demo environment and production environment

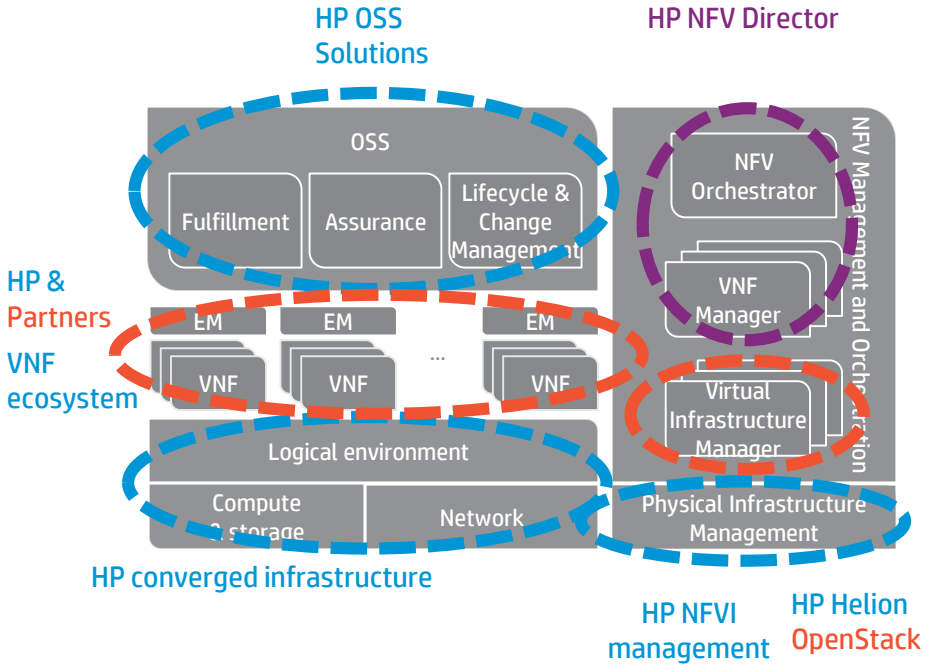
All suggestions here with the exception of the NFV director are just indications and need to be validated with the VNF vendors and the VIM provider



Things to consider

Bottom up

1. **Hardware**
    1. Hardware is always needed from Laptop to a bunch of servers and enclosures
2. **Hypervisor**
    1. For each host you need and hypervisor (typically VMware or KVM)
        1. E.g. Typically 1 server per hypervisor
3. **VIM**
    1. To manage the different hypervisors, is typically a Virtual Infrastructure manager is required.
        1. E.g. From 1 server to 10 servers to host the VIM
4. **VNFM**
    1. Most advanced VNFM are virtual machines and can run inside the infrastructure managed by the VIM, a few need a dedicated physical host
5. **Orchestrator**
    1. Orchestrator manages the VNF Managers, the VIMs and the Isolated hypervisors
    2. From 1 Virtual machine to several physical host in cluster



High level Hardware sizing

As high level guidelines the following document shows recommendations of the HW for different scenarios

- Minimal demo set up
- POC small size
- POC medium size
- Lab for Multi VNF demonstrations
- Basic production set up for NFVD
- Example for production for NFVD

Minimal demo set up

- How to perform a minimal demo

POC small size

- Set up for small environment

POC medium size

- Set up for medium environment

Lab for Multi VNF demonstrations

- Set up for a demonstration lab

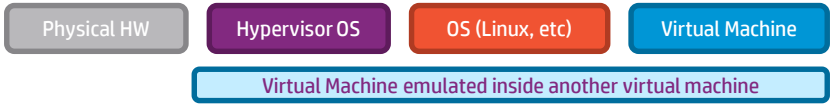
Basic production set up for NFVD

- Starting point for small production

Example for production for NFVD

- Example of a single production site

Minimal demo setup

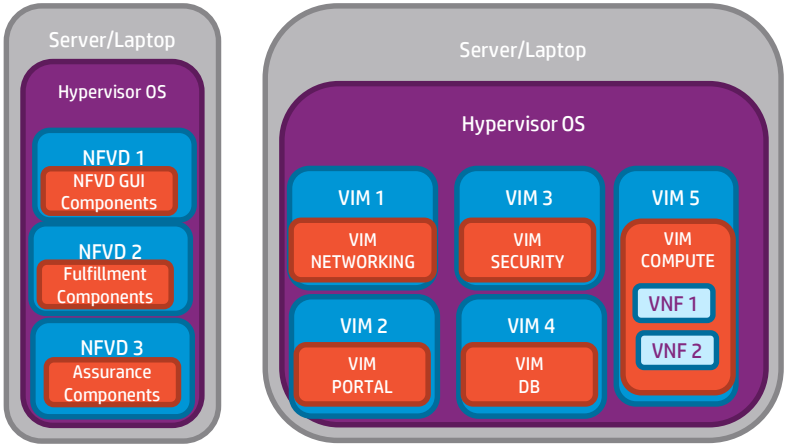


Resources needed

Scope

- For concept demonstrations with example Virtual machines (not real VNFs)
- Demonstrate that few VNFs with very few resources can be created, deleted and orchestrated

http://docs.openstack.org/image-guide/content/ch_obtaining_images.html



Minimal demo setup

Resources needed

ETSI FUNCTION	PRODUCT	COMPONENT	QUANTITY	RESOURCE TYPE	CORE	RAM (GB)	DISK (GB)	NETWORKING
VNF Orchestrator	HP NFV Director	All NFV Director modules	1	Virtual Machine	4	8	100	Nothing specific (100Mps Ethernet and above)
VNF Manager	HP NFV Director	Embedded VNF	0	Included in the above*	*	*	*	*

* Consult VNF vendors and VIM provider documents for VNFM and VNF & VIM sizes respectively

Minimal demo setup: Example

Server distribution

Server 1

- Used for Orchestrator

Server 2

- Used for VIM to run Virtual Machines in emulation mode

RESOURCE TYPE	CORE	RAM (GB)	DISK (GB)	NICs	NETWORKING
Server/Laptop 1	4	16	200	1 or more	Nothing specific (100Mps Ethernet and above)
Server/Laptop 2	8	16	200	1 or more	Nothing specific (100Mps Ethernet and above)

http://jpc.sourceforge.net/oldsite/Emulation.html

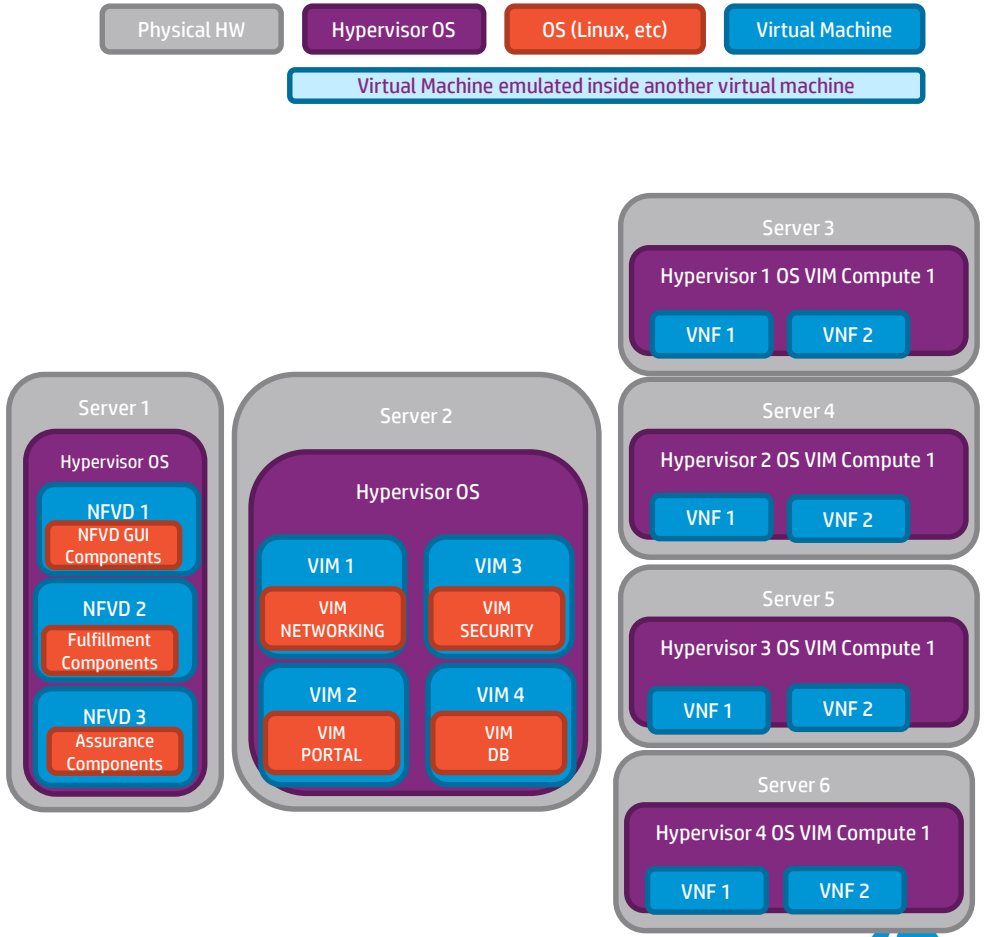
POC small size

Resources needed

Scope

- Demonstrate real VNFs typically within a single VIM a potentially 2 different hypervisors

If Helion VIM or production VIM are used additional servers/blades may be needed to run the management components



POC small size

Resources needed

ETSI FUNCTION	PRODUCT	COMPONENT	QUANTITY	RESOURCE TYPE	CORE	RAM (GB)	DISK (GB)	NETWORKING
VNF Orchestrator	HP NFV Director	All NFVD GUI modules	1	Virtual Machine	4	16-32	60	Nothing specific (100Mps Ethernet and above)
VNF Orchestrator	HP NFV Director	All Fulfillment modules	1	Virtual Machine	4	16-32	60	Nothing specific (100Mps Ethernet and above)
VNF Orchestrator	HP NFV Director	All Assurance modules	1	Virtual Machine	4	16-32	60	Nothing specific (100Mps Ethernet and above)
VNF Manager	HP NFV Director	Embedded VNF	0	Included in the above*	*	*	*	*

* Consult VNF vendors and VIM provider documents for VNFM and VNF & VIM sizes respectively

POC Small size: Example

Server distribution

Enclosure

- Can be used individual servers or an enclosure with blades

Server/Blade 1

- Used for Orchestrator

Server/Blade 2

- Used for VIM to run management components

Server/Blade 3,4,5,6

- Used to host VNF and VNFM as virtual machines

RESOURCE TYPE	QTY	CORE	RAM (GB)	DISK (GB)	NICs	NETWORKING
Enclosure (optional)	0-1	NA	NA	NA	1+	Without Virtual connect
Server/Blade 1	1	8	64	250	1 or more	Nothing specific (100Mps Ethernet and above)
Server/Blade 2	1	8	128	500	1 or more	Nothing specific (100Mps Ethernet and above)
Server/Blade 3,4,5,6	4	8	128	500	1 or more	Nothing specific (100Mps Ethernet and above)

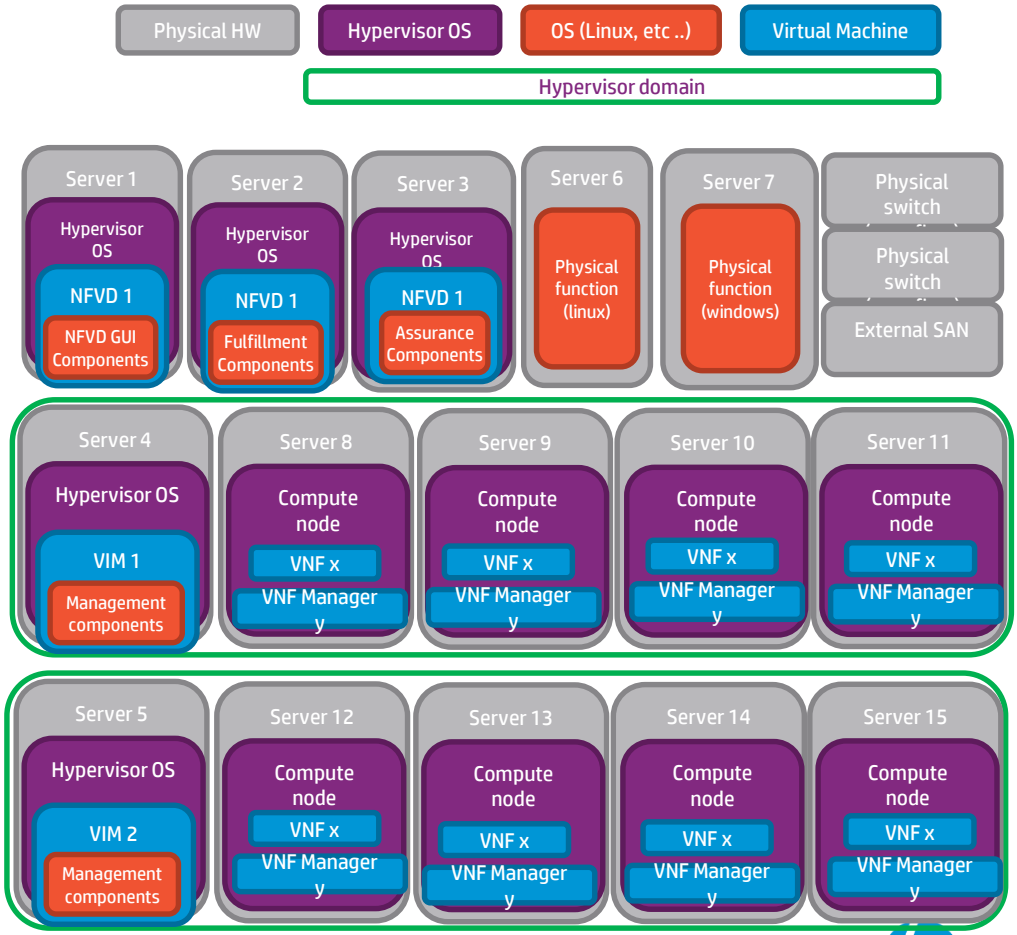
POC Medium size

Resources needed

Scope

- Demonstrate real VNFs typically with one or 2 VIMs (potentially more) 2 different hypervisors and potentially real networking and physical servers

If Helion VIM or production VIM are used additional servers/blades may be needed to run the management components



POC Medium size

Resources needed

ETSI FUNCTION	PRODUCT	COMPONENT	QUANTITY	RESOURCE TYPE	CORE	RAM (GB)	DISK (GB)	NETWORKING
VNF Orchestrator	HP NFV Director	All NFVD GUI modules	1	Virtual Machine	4-8	64-128	200	Nothing specific (100Mps Ethernet and above)
VNF Orchestrator	HP NFV Director	All Fulfillment modules	1	Virtual Machine	4-8	64-128	200	Nothing specific (100Mps Ethernet and above)
VNF Orchestrator	HP NFV Director	All Assurance modules	1	Virtual Machine	4-8	64-128	200	Nothing specific (100Mps Ethernet and above)
VNF Manager	HP NFV Director	Embedded VNF	0	Included in the above*	*	*	*	*

* Consult VNF vendor and VIM provider documents for VNFM and VNF & VIM sizes respectively
** Consult PNF vendor for its sizing requirements

POC Medium size: Example

Server distribution

Enclosure

- For this amount of server normally is better a enclosure with NO Virtual connect

Server/Blade 1,2

- Used for Orchestrator

Server/Blade 3,4

- Used for VIM to run management components (typically 2 VIMS)

Server/Blade 5,6

- Used to demonstrate physical functions working with virtual ones

Server/Blade 7,8,9,10,11,12,13,14

- Used to host VNF and VNFM as virtual machines

Physical switch (openflow)

- To demonstrate physical networking or SDN

External SAN

- To demonstrate external storage

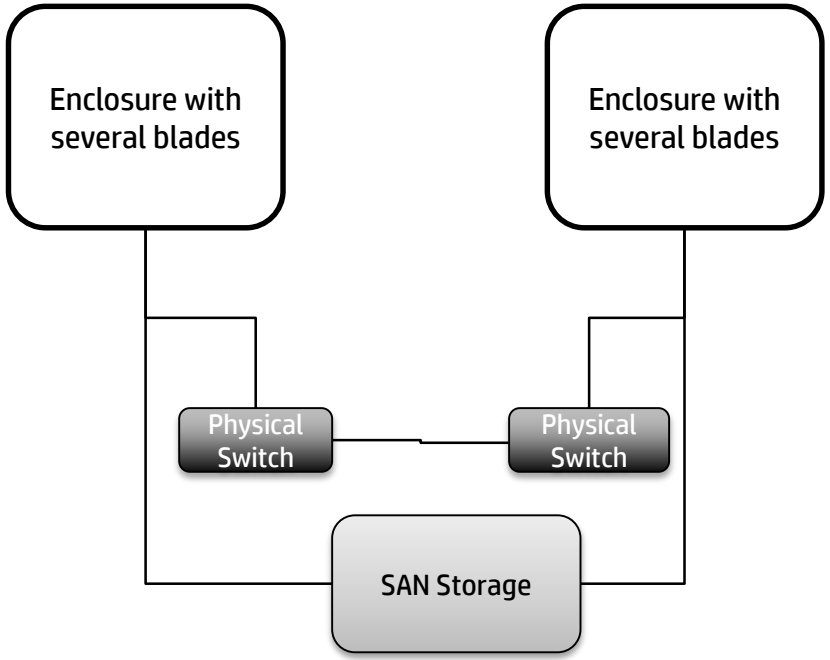
RESOURCE TYPE	QTY	CORE	RAM (GB)	DISK (GB)	NICs	NETWORKING
Enclosure (optional)	0-1	NA	NA	NA	1+	Without Virtual connect
Server/Blade 1	1	8	128	500	1 or more	Nothing specific (100Mps Ethernet and above)
Server/Blade 2	1	8	128	500	1 or more	Nothing specific (100Mps Ethernet and above)
Server/Blade 3,4	2	8	256	1.000	1 or more	Nothing specific (100Mps Ethernet and above)
Server/Blade 5,6	0-2	8	256	1.000	1 or more	Nothing specific (100Mps Ethernet and above)
Server/Blade 7,8,9,10,11,12,13,14	8	8	256	1.000	1 or more	Nothing specific (100Mps Ethernet and above)
Physical switch (openflow)	0-2	NA	NA	NA	5 or more	Nothing specific (100Mps Ethernet and above)
External SAN	0-1	NA	NA	10.000	1 or more	Nothing specific (100Mps Ethernet and above)

Lab for Multi VNF demonstrations

Resources needed

Scope

- Medium Setup simulating to physical locations (each location represented with 1 enclosure with similar set up as POC medium size)
- More



Lab for Multi VNF demonstrations

Resources needed

ETSI FUNCTION	PRODUCT	COMPONENT	QUANTITY	RESOURCE TYPE	CORE	RAM (GB)	DISK (GB)	NETWORKING
VNF Orchestrator	HP NFV Director	All NFVD GUI modules	1	Virtual Machine	8	128	200	Nothing specific (100Mps Ethernet and above)
VNF Orchestrator	HP NFV Director	All Fulfillment modules	1	Virtual Machine	8	128	200	Nothing specific (100Mps Ethernet and above)
VNF Orchestrator	HP NFV Director	All Assurance modules	1	Virtual Machine	8	128	200	Nothing specific (100Mps Ethernet and above)
VNF Manager	HP NFV Director	Embedded VNF	0	Included in the above*	*	*	*	*

* Consult VNF vendor and VIM provider documents for VNFM and VNF & VIM sizes respectively
** Consult PNF vendor for its sizing requirements

Lab for Multi VNF demonstrations: Example

Server distribution

Enclosure

- 2 enclosures for demonstration of different locations

Blade for NFVD

- Used to host 1 or 2 instances of NFVD

Blades for VIM management

- Blades to host several VIM

Blades for compute nodes

- Used to host VNF and VNFM as virtual machines

Physical servers

- Used to demonstrate physical functions working with virtual ones

Physical switch (openflow)

- To demonstrate physical networking or SDN

External SAN

- To demonstrate external storage

RESOURCE TYPE	QTY	CORE	RAM (GB)	DISK (GB)	NICs	NETWORKING
Enclosure	2	NA	NA	NA	1+	Without Virtual connect
Blade for NFVD	2-4	8	256	1.000	1 or more	Nothing specific (100Mps Ethernet and above)
Blades for VIM management	8	8	256	1.000	1 or more	Nothing specific (100Mps Ethernet and above)
Blades for compute nodes	16	8	256	1.000	1 or more	Nothing specific (100Mps Ethernet and above)
Physical servers	4	8	256	1.000	1 or more	Nothing specific (100Mps Ethernet and above)
Physical switch (openflow)	2	NA	NA	NA	5 or more	Nothing specific (100Mps Ethernet and above)
External SAN	1	NA	NA	10.000	1 or more	Nothing specific (100Mps Ethernet and above)

Basic production set up for NFVD

Server distribution

Fulfillment

- 1 Fulfillment server
- 1 Fulfillment DB server

Assurance

- 1 Monitor server
- 1 Correlation server
- 1 Correlation database server

NFVDGUI

- 1 NFVD GUI server

RESOURCE TYPE	QTY	CORE	RAM (GB)	DISK (GB)	NICs	NETWORKING
Fulfillment server	1	4	128	1000	2+	2 ports (1Gps Ethernet and above)
Fulfillment DB server	1	8	128	1.000	2+	2 ports (1Gps Ethernet and above)
Monitor server	1	4	128	1.000	2+	2 ports (1Gps Ethernet and above)
Correlation server	1	4	128	1.000	2+	2 ports (1Gps Ethernet and above)
Correlation DB server	1	4	128	1.000	2+	2 ports (1Gps Ethernet and above)
NFVD GUI Server	1	4	128	1.000	2+	2 ports (1Gps Ethernet and above)

Of course, servers can be replaced with VMs with the same amount of dedicated non-shared resources

Multiple setups are possible depending on specific environment and use case requirements this is just an example

Example for production for NFVD

Server distribution

Fulfillment

- 1 Fulfillment portal server
- 1 Fulfillment GW server
- 2 Fulfillment engine servers in cluster

Assurance

- 2 Monitor server in cluster
- 2 Correlation servers in cluster

DB

- 2 DB server in a cluster

NFVD GUI

- 1 NFVD GUI Server

RESOURCE TYPE	QTY	CORE	RAM (GB)	DISK (GB)	NICs	NETWORKING
Fulfillment Portal	1	4	256	1000	2+	2 ports (1Gps Ethernet and above)
Fulfillment GW	1	8	256	1.000	2+	2 ports (1Gps Ethernet and above)
Fulfillment Engine Cluster	2	4	256	1000	2+	2 ports (1Gps Ethernet and above)
NFVD DB server cluster	2	8	256	1.000	2+	2 ports (1Gps Ethernet and above)
Monitor server cluster	2	8	256	1.000	2+	2 ports (1Gps Ethernet and above)
Correlation server cluster	4	4	256	1.000	2+	2 ports (1Gps Ethernet and above)
NFVD GUI	1	4	256	1.000	2+	2 ports (1Gps Ethernet and above)

Of course, servers can be replaced with VMs with the same amount of dedicated non-shared resources

Multiple setups are possible depending on specific environment and use case requirements this is just an example

High Availability set up for NFVD

Basic global server distribution

NFVD GUI

- 1 NFVD GUI server

Fulfillment

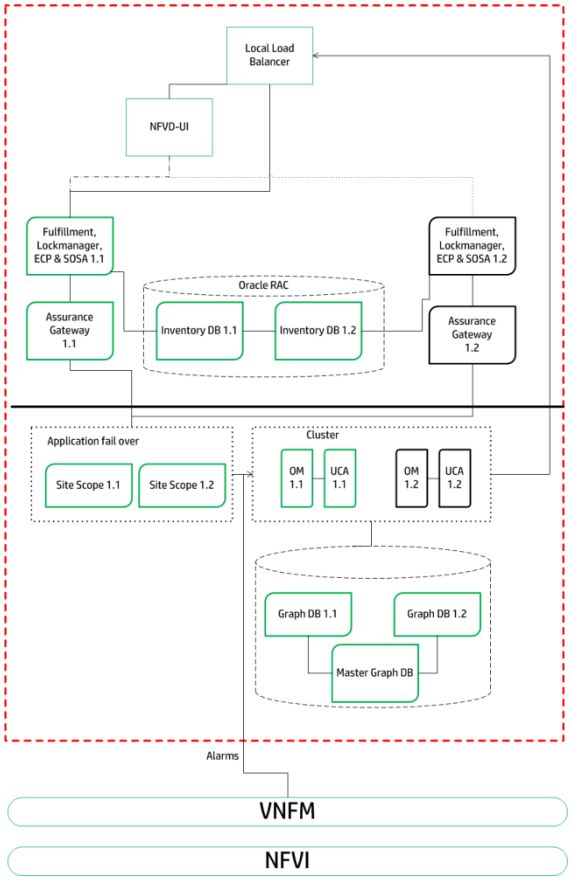
- 2 Fulfillment servers (Fulfillment, LockManager, ECP & SOSA)

Assurance

- 2 Assurance Gateway servers
- Cluster for Site Scope Servers: 2 nodes
- Cluster for (Open Mediation + UCA): 2 nodes

DB

- Oracle RAC for Inventory: 2 nodes
- Neo4j Master Graph Database: 2 nodes



High Availability set up for NFVD

Basic global server distribution

NFVD GUI

- 1 NFVD GUI server
  - ➢ *GUI doesn't store any data, any context: HA no needed*

Fulfillment

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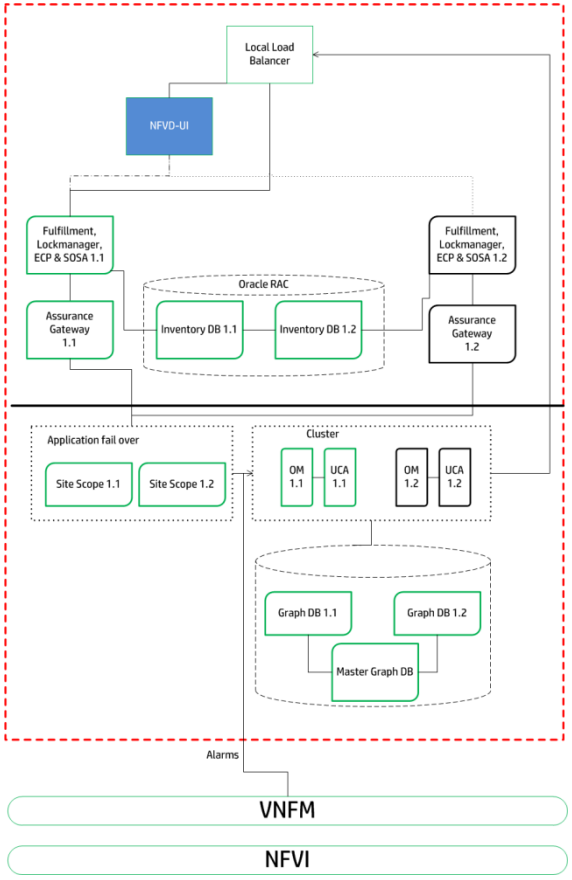

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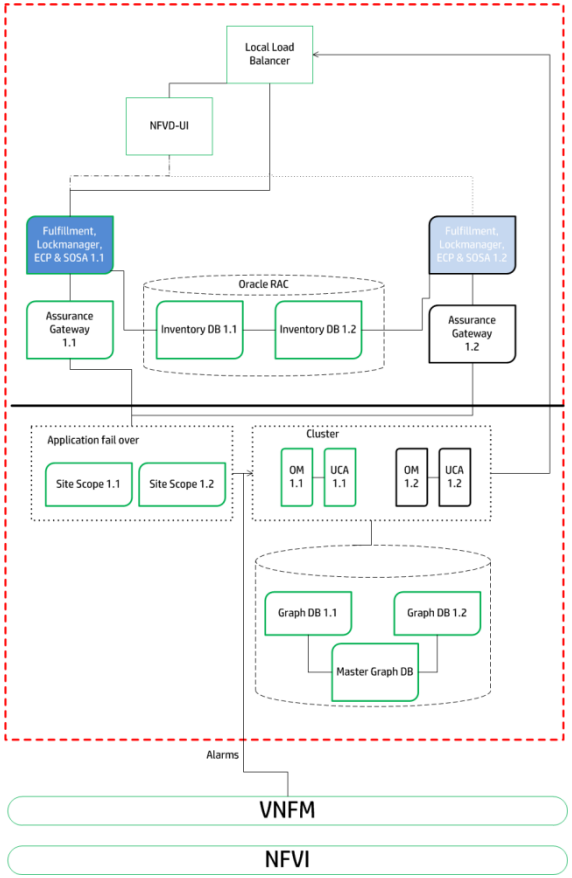

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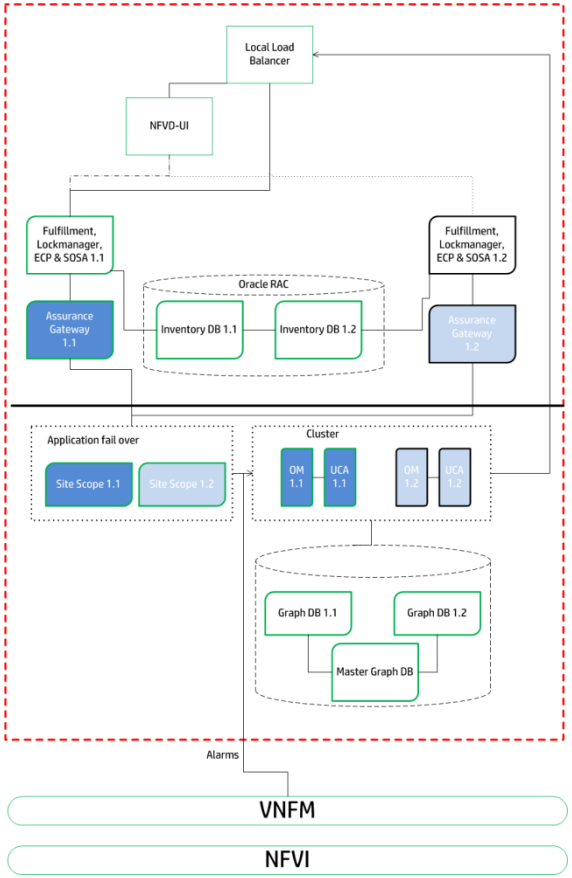

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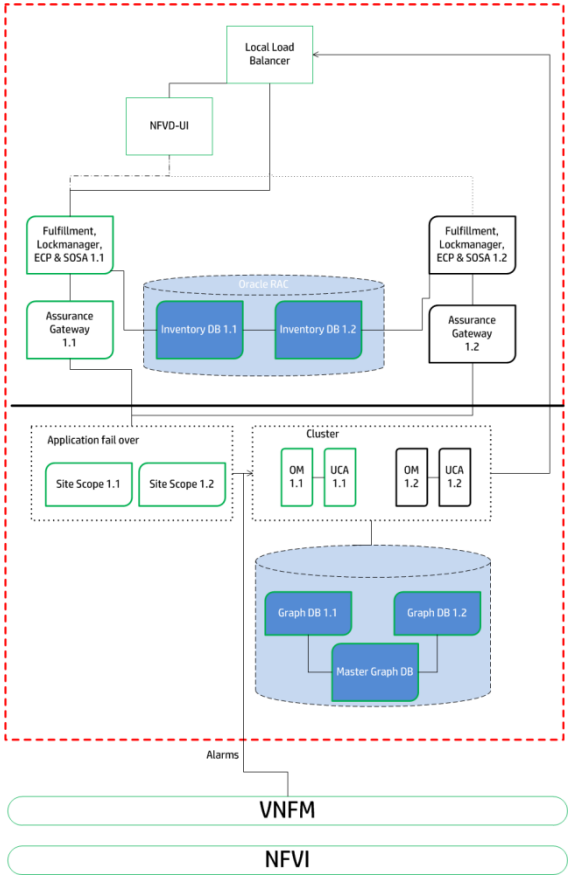
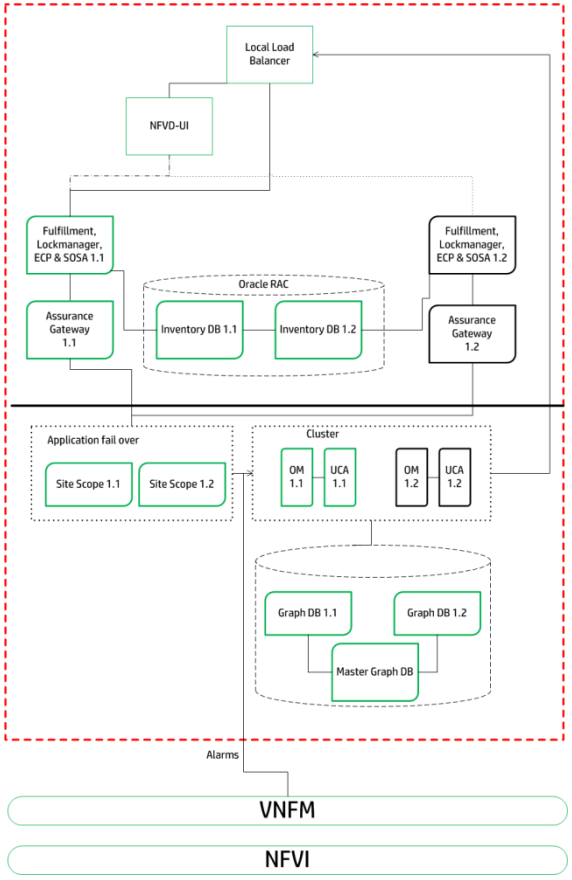


High Availability set up for NFVD

Mode supported by NFVD Components

NFVD Component	HA mode supported
HPSA	Active, Active Cluster formation with N nodes
HPSA Extension Packs	Active, Passive Cluster formation with N nodes
SiteScope	Active, Hot Standby Cluster formation with 2 nodes only
UCA-EBC + Open Mediation	Active, Passive Cluster formation with N nodes
Oracle RAC	Active, Active Custer formation with N nodes
Neo4j Graph database	Active, Active with N nodes
Assurance Gateway	Active, Active with one instance per HPSA node



HA & Disaster Recovery set up for NFVD

Global server distribution

Site 1

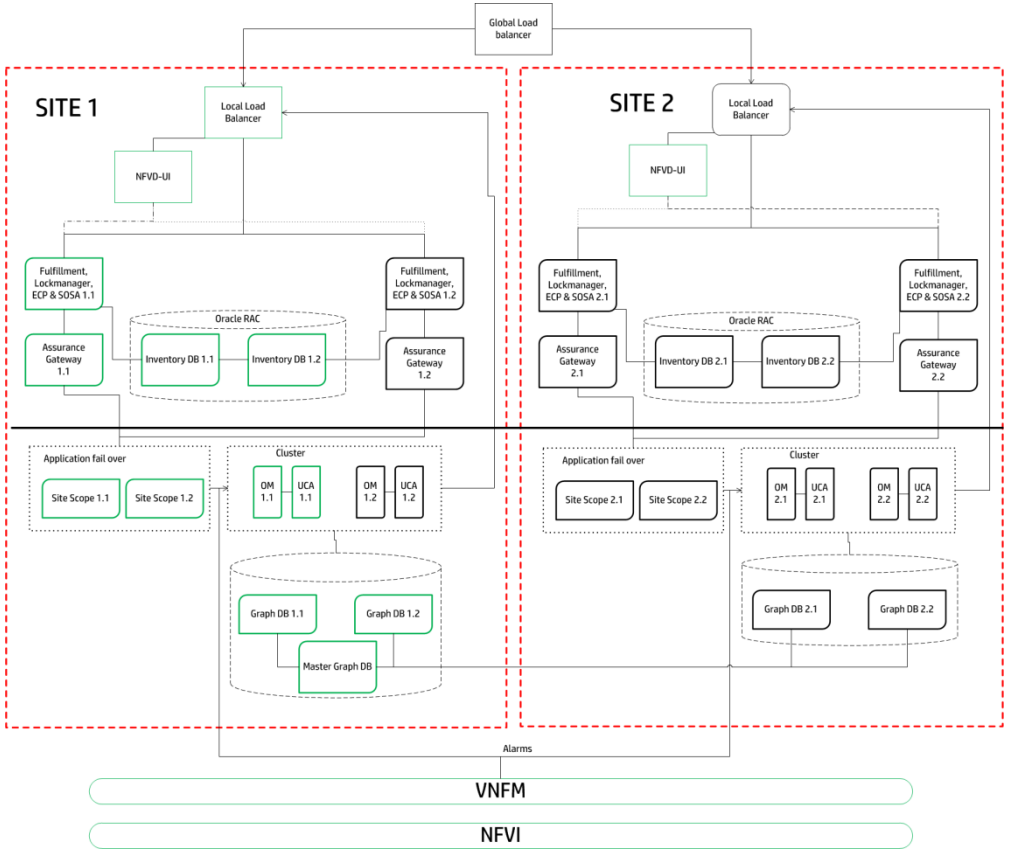
- Primary site (ACTIVE)

Site 2

- Back up Site 1 (PASSIVE)

Routing

- Using external load balancer



HA & Disaster Recovery set up for NFVD

Global server distribution

Normal usage

Site 1

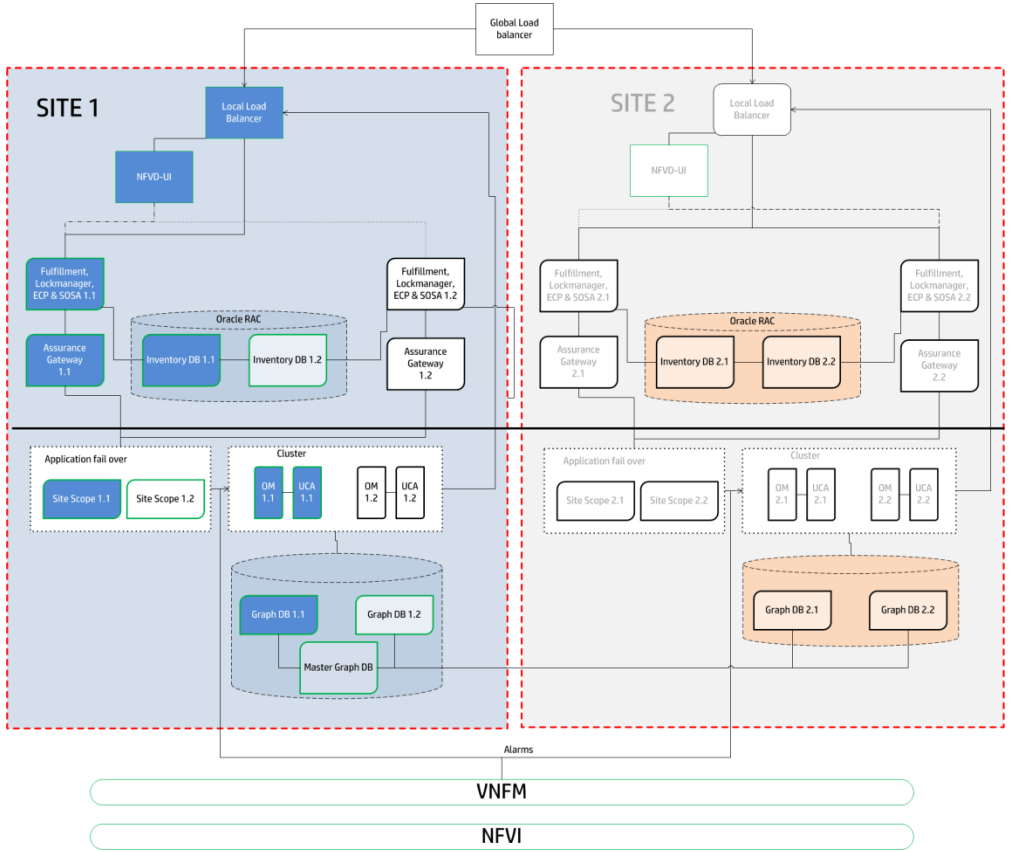
- Primary site (**ACTIVE**)

Site 2

- Back up Site 1 (PASSIVE)

Routing

- Using external load balancer



HA & Disaster Recovery set up for NFVD

Global server distribution

Disaster Recovery usage

Site 1

- Dead (INACTIVE)

Site 2

- Primary site (**ACTIVE**)

Routing

- Using external load balancer